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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/624,313	07/22/2003	Sujatha Ramanujan	86678NAB	7288

7590 01/31/2005

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EXAMINER	
PHAM, HAI CHI	

ART UNIT	PAPER NUMBER
2861	

DATE MAILED: 01/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/624,313	RAMANUJAN ET AL.	
	Examiner	Art Unit	
	Hai C Pham	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 November 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35,40-47,49-93 and 95-103* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *54-65 and 96-102* is/are allowed.

6)☒ Claim(s) *1-35,40-47,49-53,66-82, 84-93,95 and 103* is/are rejected.

7)☒ Claim(s) *83* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Terminal Disclaimer

1. The terminal disclaimer filed on 11/12/04 disclaiming the terminal portion of any patent granted on this application, which would extend beyond the expiration date of U.S. Patent 6,580,490 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 6, 9-12, 14-35, 40-44, 47, 49-51, 78-82, 84-89, 91 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramanujan et al. (U.S. 6,125,547) in view of Hyatt (U.S. 4,672,457).

Ramanujan et al. ('547), an acknowledged prior art, discloses a reflective liquid crystal modulator based printing system, which comprises all the claimed elements a control logic processor capable of controlling the operation of said apparatus for printing based on said digital image data (inherent to the printing system for conducting the normal printing operation), an image forming assembly (Fig. 1a) for directing onto said light sensitive medium (160) disposed at said image plane (150), an exposure beam for

printing, said image forming assembly comprising a light source (30) for providing light exposure energy for imaging onto said light sensitive medium, a first lens assembly (11) for directing said light exposure energy to a spatial light modulator (52), a beamsplitter (50), which directs said light exposure energy to said spatial light modulator, said spatial light modulator having a plurality of individual elements capable of altering a polarization state of said light exposure energy to provide an exposure beam for printing, a state of each of said elements controlled by said control logic processor according to said digital image data (col. 3, line 61 to col. 4, line 7), a second lens assembly (132) for directing said exposure beam onto said light sensitive medium.

Ramanujan et al. ('547) fails to teach the temperature profile control apparatus for controlling a temperature profile of said spatial light modulator, a heat sink, a thermo-electric cooler, a multi-element temperature controller, a localized environmental controller, a uniform temperature profile.

However, it is well known in the art that LCD modulator is affected by ambient temperature, wherein the response is slowed at low temperature and the LCD may be degraded due to high temperature such as by absorbing incident illumination, by heat dissipation due to electrical excitation and that the LCD modulator is provided with a heat conductive device to constantly maintain the LCD at the optimum operating temperature as evidenced by Hyatt, which discloses a scanner system using a localized temperature-controlled LCD device with the help of a thermal conduction device (1621-1624) attached to the LCD device, the thermal conduction device can be a heat sink, a thermo-electric cooler (see Figs. 16A-16F) (col. 105, line 22 to col. 107, line 35).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide a localized temperature controlled device to the spatial light modulator in the device of Ramanujan et al. ('547) as taught by Hyatt. The motivation for doing so would have been to prevent poor response and/or degradation of the modulator as well as to constantly keep the modulator at the optimum operating temperature as suggested by Hyatt.

Ramanujan et al. ('547) further teaches all the claimed elements as recited in claims 2-3, 6, 9-12, 20-35, 40-44, 47, 49-51 (see Figs. 1 and 9).

The method claims 78-82, 84-89 and 91 are deemed to be clearly anticipated by functions of the above structures.

4. Alternatively, claims 1-5, 6, 9-12, 14-35, 40-44, 47, 49-51, 78-82, 84-89, 91, 103 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramanujan et al. (U.S. 6,125,547) in view of Ramanujan et al. (U.S. Pub No. 2003/0035123).

Ramanujan et al. ('547) teaches all the basic claimed limitations (please refer back to paragraph 3 above) but fails to teach the temperature profile control apparatus for controlling a temperature profile of said spatial light modulator, a heat sink, a thermo-electric cooler, a multi-element temperature controller, a localized environmental controller, a uniform temperature profile, a calculated profile, the polarized beamsplitter being a wire grid or a pellicle.

Ramanujan et al. ('123) discloses an image forming apparatus using reflective spatial light modulators (230, Fig. 9) provided with a localized temperature transducer

(165) [directly attached to the spatial light modulator] for either cooling or heating the multiple elements making-up the spatial light modulator in order to hold the temperature at the device constant or uniform, knowing that variation of the temperature at the modulator could shift the reflectance of the modulator and would require re-calibration, the temperature transducer can be a thermoelectric cooler, which controls the temperature of the multi-elements of the reflective spatial light modulator (paragraphs [0111] and [0112]). Ramanujan et al. ('123) further teaches the polarization beamsplitters may comprise a pellicle or a wire grid polarizer (paragraph [0073]).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the spatial light modulator of Ramanujan et al. ('547) with the cooling system as well as the beamsplitter comprising a pellicle or wire grid as taught by Ramanujan et al. ('123). The motivation for doing so would have been to ensure the localized temperature be kept constant across the multiple elements of the modulator and to prevent image non-uniformities as suggested by Ramanujan et al. ('123).

Ramanujan et al. ('547) further teaches all the claimed elements as recited in claims 2-3, 6, 9-12, 20-35, 40-44, 47, 49-51 (see Figs. 1 and 9).

The method claims 78-82, 84-89 and 91 are deemed to be clearly anticipated by functions of the above structures.

5. Claims 7-8, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramanujan et al. ('547) in view of Ramanujan et al. ('123), as applied to claim 1 above, and further in view of Pasch (U.S. 5,055,871).

Ramanujan et al. ('547), as modified by Ramanujan et al. ('123), discloses all the basic limitations of the claimed invention except for the uniformizer being a fiber.

Pasch discloses an apparatus for enhancing illumination uniformity in a lithographic device by using uniformizer such as fly-eye lenses, light pipe of fiber optic bundles.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide a fiber optic bundles as uniformizer in the device of Ramanujan et al. ('547) as taught by Pasch. The motivation for doing so would have been to provide enhanced illumination uniformity.

6. Claims 45-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramanujan et al. ('547) in view of Ramanujan et al. ('123), as applied to claim 1 above, and further in view of Besinger et al. (U.S. 5,502,532).

Ramanujan et al. ('547), as modified by Ramanujan et al. ('123), discloses all the basic limitations of the claimed invention except for using a chemical bath or heat for developing the photosensitive medium.

However, the method and apparatus for heat-developed or chemically-developed photographic film is well known in the art as evidenced by Besinger et al.

It would have been obvious at the time the invention was made to a person

having ordinary skill in the art to provide the chemical or heat developer in the device of Ramanujan et al. ('547) since Besinger et al. teaches this to be known in the art for developing photographic film.

7. Claims 52-53, 90, 92-93, 95 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramanujan et al. ('547) in view of Ramanujan et al. ('123), as applied to claim 1 above, and further in view of Hisaaki (U.S. 5,438,345).

Ramanujan et al. ('547), as modified by Ramanujan et al. ('123), discloses all the basic limitations of the claimed invention except for recording medium supply and the sensor for sensing the width of the supplied recording medium.

However, Hisaaki discloses an image forming apparatus provided with a paper supply cassette (52) for supplying the recording medium (P) and a manual feeding tray (53) for supplying recording medium of different types and sizes, wherein the apparatus is also provided with various sensors for sensing the availability as well as the type and size of recording medium such that the output level of the light source in the optical head can be automatically adjusted based on the information provided by the sensors.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide recording medium supply and the medium-size sensing device to the device of Ramanujan et al. ('547) as taught by Hisaaki. The motivation for doing so would have been to automatically adjust the output level of the exposure light based on the supplied recording medium.

8. Claims 66-77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramanujan et al. ('547) in view of Hirao et al. (U.S. 5,887,236).

Ramanujan et al. ('547) discloses all the basic limitations of the claimed invention except for the temperature profile apparatus for controlling a temperature profile of the light sensitive medium.

Hirao et al. discloses an image forming apparatus wherein the temperature of the pre-heat treatment of the recording medium (11) is controlled in accordance with the thickness and characteristics of the recording medium.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the recording medium in the device of Ramanujan et al. ('547) with the cooling device as taught by Hirao et al. The motivation for doing so would have been to promote the sensitivity response of the recording medium.

Allowable Subject Matter

9. Claims 54-65 and 96-102 are allowed.

10. Claim 83 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is an examiner's statement of reasons for allowance: claim 54 is patentable over the prior art patents and printed publications because of the specific configuration of the beamsplitter for use in the image forming apparatus, wherein the

beamsplitter is provided with a temperature profile control apparatus for controlling the temperature profile of the beamsplitter. The combined limitations are not taught by the prior art of record alone or in combination.

Claims 96 and 100 are patentable over the prior art patents and printed publications because of the specific image recording method wherein a format is selected from a set of available layout formats, wherein a grouping of exposure elements on a spatial light modulator is correlated with said selected format for modulation based on image data and wherein the temperature profile of the spatial light modulator is controlled. The combined limitations are not taught by the prior art of record alone or in combination.

The primary reason for the indication of the allowability of claim 83 is the inclusion therein, in combination as currently claimed, of the limitation "wherein said illumination is turned off, allowing residual images to decay, turning illumination back on, printing an additional two-dimensional image", which is not found taught by the prior art of record considered alone or in combination.

Claims 55-65, 97-99 and 101-102 are allowed because they are directly or indirectly dependent from claims 54, 96 and 100 above.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

12. Applicants' arguments filed 11/12/04 with respect to claims 1-35, 40-47, 49-53, 78-93 and 95-103 have been considered but are moot in view of the new grounds of rejection presented in this Office action.

13. Applicants' arguments with respect to claims 66-77 have been fully considered but they are not persuasive. Applicants argue that the provision of the heating or cooling of the recording medium is "to ameliorate differences in the temperature profile of the spatial light modulator". However, the claimed limitations as recited in the above-mentioned claims 66-77 do not indicate (a) the temperature profile of the spatial light modulator being controlled, (b) the clear purpose of controlling the temperature profile of the recording medium and (c) any relationship between the temperature profile control of the recording medium and the differences in the temperature profile of the spatial light modulator. In other words, the claimed limitation "a temperature profile controller apparatus for controlling a temperature of said light sensitive medium" can be interpreted as a controlled-temperature pre-treatment of the light sensitive medium to promote the sensitivity response of the light sensitive medium as taught by Hirao et al.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L Talbott can be reached on (571) 272-1934. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Hai Li Pham

HAI PHAM
PRIMARY EXAMINER

January 27, 2005